

## ALTERNATING PHASE SHIFT MASK DESIGN WITH OPTIMIZED PHASE SHAPES

### **ABSTRACT**

A method is described for designing an alternating phase shifted mask (altPSM) by optimally selecting the width of phase shapes. The selection of optimal phase shape widths is achieved by providing a lithography metric that describes the relationship between phase shape width and the target image dimension such that the metric, such as process window or across chip linewidth variation (ACLV), is optimized. In a preferred embodiment, ACLV is computed by Monte Carlo simulation by providing a set of error distributions for lithographic parameters such as focus, dose, lens aberrations, and the like. Alternatively, a lookup table of optimal phase widths associated with target image dimensions may be provided. The resulting altPSM is characterized by phase shapes having widths that vary according to the widths of the target image dimensions.